IOSR Journal of Mathematics (IOSR-JM)
e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 11, Issue 5 Ver. III (Sep. - Oct. 2015), PP 06-07
www.iosrjournals.org

On Q*g closed sets in Supra Topological Spaces

C.R.Parvathy[1] and U.Remya[2]

Assistant professor, Department of mathematics, PSGR Krishnammal college for women, Coimbatore-641004.
Research Scholar, Department of mathematics, PSGR Krishnammal college for women, Coimbatore-641004.

Abstract:*The aim of this paper is to introduce and study some properties of supra topological spaces. We introduce the concepts of supra Q*g closed sets ,Supra Q*g open sets,Supra Q*closed sets and supra Q*open sets.*
Keywords : *supra Q*g closed sets, supra Q*g open sets, supra Q*closed sets, supra Q* open sets.*

I. Introduction

Levin**[2]** introduced generalized closed set in topological spaces in the year 1970. In 1983, Mashhour et al**[3]** introduced supra topological spaces. Closed sets are fundamental objects in a topological space. The notion of Q* closed sets in a topological spaces was introduced by Murugalingam and lalitha**[4]** in 2010. In this paper introduced Q*g closed sets in supra topological space. P.Padma and S.Udayakumar**[6]**introduced Q*g closed sets in topological space in the year 2015.

II. Preliminaries

Definition 2.1 :[2] A topological Space (X, τ) is said to be generalized closed (briefly g-closed) set if cl(A) $\subseteq$ U whenever A $\subseteq$ U and U is open (X, τ).

Definition 2.2 :[8] A topological space (X, τ) is said to be generalized star closed (briefly g*- closed) set if cl(A) $\subseteq$ U whenever
A$\subseteq$ U and U is g-open(X,τ).

Definition 2.3 :[7] A topological space (X, τ) is said to be generalized star star closed (briefly g**-closed) set if cl(A) $\subseteq$ U whenever A$\subseteq$ U and U is g*-open(X, τ).

Definition 2.4 :[2] Let X be a non empty set. The subfamily $\mu \subseteq \wp(X)$ where $\wp$ (X) is the power set of X is said to be a supra topology on X if X $\in \mu$ and μ is closed under arbitrary unions.
The pair (X, μ) is called a supra topological space. The elements of μ are said to be supra open in (X, μ). Complements of supra open sets are called supra closed sets.

Definition 2.5 :[9] Let A be a subset of (X, μ). Then the supra closure of A is denoted by
$cl^{\mu}(A) = \cap \{ B / B$ is a supra closed set and $A \subseteq B\}$.

Definition 2.6 :[9] Let A be a subset of (X, μ). Then the supra interior of A is denoted by
$int^{\mu}(A)= \cup\{ B / B$ is a supra open set and $A \supseteq B\}$.

Definition 2.7 :[1] Let (X, μ) be a topological space and μ be a supra topology on X. μ is supra topology associated with τ if $\tau \subseteq \mu$.

III. On Q*G Closed Sets In Supra Topological Spaces

Definition 3.1 : A subset A of a supra topological space (X, μ) is called
(1) a supra Q* - closed if int^{μ} (A) = $\emptyset$ and A is closed.
(2) a supra Q* - open if $cl^{\mu}(A) = X$ and A is open.

Definition 3.2 : A subset A of supra topological space (X, μ) is called a supra Q*g closed if $cl^{\mu}(A) \subseteq U$. whenever A $\subseteq$ U and U is Q* - open in (X, μ). The complement of a supra Q*g closed set is called supra Q*g open set.

Theorem 3.3 : Every supra closed set is supra Q*g closed.

Proof : Let A⊆ X be a supra closed set and A ⊆ U and U is supra Q* open.
Since A is supra closed, $cl^{\mu}(A) = A$ and hence $cl^{\mu}(A) = U$.
Therefore A is supra Q*g closed.

Converse part : Every supra Q*g closed set is not supra closed.
Proof :
Let A be supra Q*g closed set .since $cl^{\mu}(A) \subseteq U$. whenever A ⊆ U.
And U is Q* open in (X, μ). Since the elements of μ are called supra open in (X, μ).
Therefore every supra Q*g closed set is not supra closed.

Remark 3.3: The converse of the theorem is not true as shown in the following example.
Example 3.4 : Let X = { a,b,c,d,e } , μ = { ∅ , X ,{a,b},{a,b,d},{b,c,d},{c,d,e}}
A = { a,b,c } is supra Q*g closed but not supra closed.

Corollary 3.5: Every closed set is supra Q*g closed.

Proof : Every closed set is supra closed. By the theorem "Every Supra closed set is supra Q*g closed".
Theorem 3.6: A subset A of X is supra Q*g closed if and only if $cl^{\mu}(A) \setminus A$ contains no non empty supra Q*-closed set.

Proof :
Necessity : Let F be a supra Q* closed set of $cl^{\mu}(A) \setminus A$ that is $F \subseteq cl^{\mu}(A) \setminus A$.
Now $A \subseteq F^c$. Where F^c is supra Q* open.
Since A is supra Q*g closed.$cl^{\mu}(A) \subseteq F^c \Rightarrow F \subseteq [cl^{\mu}(A)]^c$.
Therefore $F \subseteq cl^{\mu}(A) \cap [cl^{\mu}(A)]^c = \emptyset$.
Hence F^c is supra Q* open, $cl^{\mu}(A) = X$ and A is open.
Therefore $F^c \neq \emptyset$.

Sufficiency : Suppose A⊆ U and U is supra Q* open.
Suppose $cl^{\mu}(A) \not\subset U$. Then $cl^{\mu}(A) \cap U^c$ is supra Q* closed subset of $cl^{\mu}(A) \setminus A$.
Hence $cl^{\mu}(A) \cap U^c = \emptyset$.And hence $cl^{\mu}(A) \subseteq U$.
Therefore A is supra Q*g closed.
Corollary 3.7 :A supra Q*g closed set A of X is supra closed if and only if $cl^{\mu}(A) \setminus A$ is supra Q* closed.

Proof :
The supra Q*g closed set A is supra closed.
Then $cl^{\mu}(A) = A$. and hence $cl^{\mu}(A) \setminus A = \emptyset$ is supra Q*closed.
Conversely, Suppose that $cl^{\mu}(A) \setminus A$ is supra Q* -closed.
Since A is supra Q*g – closed$cl^{\mu}(A) \setminus A$ does not contain a non empty Q* closed set.
But since $cl^{\mu}(A) \setminus A$ is itself supra Q* -closed,
$cl^{\mu}(A) \setminus A = \emptyset$. Which implies $cl^{\mu}(A) = A$.
Therefore A is supra closed.

References

[1]. R.Devi, S.Sampathkumar, M.Caldas, On supra ∝- open sets and S ∝- continuous functions, General Mathematics, 16(2)(2008), 77-84.
[2]. N.Levine, Generalized closed sets in Topology, Rend. Circ. Palermo, 19(2)(1970), 89-96.
[3]. A.S.Mashhour, A.A.Allam, F.S.Mohmoud and F.H.Khedr, On Supratopological spaces, Indian J. Pure and Appl.Math., 14(4)(1983), 502-510.
[4]. M. Murugalingam and N. Lalitha, " Q* sets ", Bulletin of pure and applied sciences, Volume 29E issue 2 (2010), 369-376.
[5]. Pauline Mary Helen, Veronica Vijayan, PunithaTharani, " on supra g* closed sets ", International journal of Computer application, vol1(feb2013), 18-27.
[6]. P.Padma and S.Udayakumar, " Q*g closed sets in topological space ", international journal of Advance Research in Engineering and Applied Sciences. Vol.2, No.1(January 2015), 97 -105.
[7]. O.Ravi, G.Ramkumar, and M.Kamaraj, on Supra g-closed sets, International journal of advances and Applied mathematics,1(12)(2011), 52-66.
[8]. O.R.Sayed and T.Noiri, On supra b-open sets and supra b-continuity on topological spaces, European J.Pure and Appl.Math., 3(2)(2010), 295-302.
[9]. M.K.R.S. Veerakumar, mem.Fac.sci.kochiUniv.(Math.), 21(2001), 1-19.